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THE FALLACY OF EXCLUSIVE SCIENTIFIC
METHODOLOGY

BY THE *fallacy of exclusive scientific methodology* I mean the claim that science possesses the only valid method of knowledge, together with the denial or at least the ignoring of the existence of that which is incapable of being studied by the method of science. This is a conspicuous fallacy in the thinking of many at the present time who are devotees of scientific method to the exclusion of any other means of knowledge, and who fail to recognize that there are limitations to the scope of the sciences. In the field of psychology the fallacy is prominent in the work of the extreme behaviorists. It occurs also in the attempt of some to make scientific method the method of philosophy, which means the limitation of philosophy to such problems as are accessible to scientific investigation, with a denial, implicit at least, of the legitimacy of any other problems. Philosophers have been called "lords of the uncleared ground" of knowledge, concerned merely with matters that have not yet been dealt with by the sciences, and forced to content themselves with narrower domains after each new scientific conquest. Underlying such a conception of the unenviable position of philosophers there have lurked the ambition and the expectation of science eventually to dispossess philosophy completely by usurping the whole estate of learning. Were scientific method capable of dealing with all humanly significant problems, such a result would be inevitable and indeed "a consummation devoutly to be wished." I propose, however, to point out that there are problems which by their very nature are incapable of being reached by the scientific method and which, therefore, will remain indefinitely as distinct philosophical questions, questions, moreover, the importance of which is not surpassed by that of any of the problems of science.

In order to understand the limitations to the scientific method, it will be necessary first to state briefly what this method is. Its chief characteristics are observation, experimentation, and the application of mathematics in the formulation of the laws which observation and experimentation bring to light. It was Bacon who first clearly sounded the call to exact observation—to an accurate read-

ing of the book of nature without any prejudiced anticipation of what its contents might be. Experimentation is simply observation of events carried out under conditions of control such that the events may be isolated and repeated under identical or varied conditions, as the experimenter's wish may be. Then the conclusions of observation and experimentation are not only arranged in orderly form but they are given mathematical expression so far as this is possible. Kant said that a body of knowledge is scientific only to the extent to which it may be cast in mathematical form. Though there are other factors involved in scientific procedure, and though common usage of the term "science" justifies its application in fields that are not so mathematically exact as, for example, physics or chemistry, there is unanimity of emphasis in all the sciences upon observation of facts as the basis. As Professor Titchener says, "Scientific method may be summed up in the single word, 'observation.'" (*A Text-Book in Psychology*, p. 19.)

Scientific observation implies the existence of objects and the occurrence of events which are capable of being seen, weighed, and measured, or at least of being inferred from their sensible effects, not merely by one observer but by the whole body of scientific investigators who may take the trouble to examine the facts in question. As Professor Royce has said, "Successful description, made with any scientific purpose, seems to involve the possibility of comparing together the various attempts at description made by different observers in view of the same facts." (*Outlines of Psychology*, p. 5.)

The behaviorists deserve credit for having recognized and applied this principle. Their criticism of introspection as a scientific method and of introspective psychology as a branch of natural science is wholly justified. Mr. Watson has clearly stated the case against introspective psychology as a science in the following sentences (*Behavior*, pp. 6, 26, 27): "Psychology has failed signally during the fifty odd years of its existence as an experimental discipline to make its place in the world as an undisputed natural science." "It has enmeshed itself in a series of speculative questions which . . . are not open to experimental treatment." Mr. Watson and other behaviorists are determined that their science shall be really scientific, based solidly upon observation and experimentation, without resort to introspection. For the first time in history, in the hands of Mr. Watson and other behaviorists, psychology (for behaviorism still retains this name) has become a genuine science. As

Mr. Watson says: "The key which will unlock the door of any other scientific structure will unlock the door of psychology [i. e., of behaviorism]. The differences among the various sciences now are only those necessitated by the division of labor. Until psychology recognizes this and discards everything which cannot be stated in the universal terms of science, she does not deserve her place in the sun. Behavior psychology does make the attempt for the first time" (*Psychology from the Standpoint of a Behaviorist*, p. vii).

By what sleight-of-hand performance, however, it may be asked, has non-scientific psychology transformed itself into scientific behaviorism? It has done so by ceasing to be a study of consciousness, which requires introspection, a non-scientific procedure, and by becoming merely a study of behavior, which is indeed open to strictly scientific observation and experimentation. Thus Mr. Watson, in criticizing introspective psychology, speaks of the "mistaken notion that its field of facts are conscious phenomena and that introspection is the only direct method of ascertaining these facts" (*Behavior*, p. 26). He says (*Behavior*, pp. 7, 9): "The time seems to have come when psychology must discard all reference to consciousness; when it need no longer delude itself into thinking that it is making mental states the object of observation." "It is possible to write a psychology, to define it . . . as the 'science of behavior,' and never to use the terms consciousness, mental states, mind, content, will, imagery, and the like." And in his latest book (*Psychology from the Standpoint of a Behaviorist*, p. viii), he says, "the reader will find no discussion of consciousness."

If Mr. Watson and other behaviorists of his type did not continue to apply the term "psychology" to their science, few people would have any quarrel with them. We would agree that introspection is not a scientific method; we would agree that consciousness cannot be studied otherwise than through introspection; and we would therefore agree that the study of consciousness cannot become a science. We are justified in objecting, however, to the application of the term "psychology" (which means the study of consciousness if it means anything) to the new science when defined explicitly as being *not* a science of consciousness. And we are justified still more in objecting to the tendency of some behaviorists to deny the existence of consciousness from the fact that it is incapable of being studied by the method of science. In some of the above quotations from Mr. Watson consciousness is recognized as a fact, but as a

fact to be ignored since it is outside the possible field of scientific investigation. In the following passage, however, Mr. Watson asserts his faith that sometime behaviorism will study even consciousness itself. This would mean an implicit denial of the existence of consciousness in its essential and unique nature. "Psychology as behavior," Mr. Watson says, "will, after all, have to neglect but few of the really essential problems with which psychology as an introspective science now concerns itself. In all probability even this residue of problems may be phrased in such a way that refined methods in behavior (which certainly must come) will lead to their solution" (*Behavior*, p. 28). To say that the observational method of behaviorism can eventually solve the problems of introspective psychology is to deny by implication the existence of consciousness, since consciousness, as has been indicated, and as will be shown more fully below, is something which can never be studied as an object among objects by the scientific method. Mr. Watson and other extreme behaviorists are guilty of what I have called the fallacy of *exclusive scientific methodology*.

My position will be made clearer by a further discussion of the meaning of consciousness and of the reason why it cannot be studied by the scientific method. So far as objects in the outside world are concerned, including other persons, there is no reality of which we are certain except such as is capable of common observation. We observe the behavior of animals and of men, but we are unable to *prove* that they are conscious. Even if our powers of observation were infinitely magnified so that the activity of each brain cell in a person under observation were capable of being inspected, we should observe nothing except what is the subject-matter of physiology and, in the last analysis, of physics and chemistry. As Professor Paulsen has said: "Let us imagine with Leibniz the skull of an animal or man to be as large as a mill. Suppose one could walk around in it and observe the processes of the brain as one can observe the movements of the machinery and the cogging of the wheels in the mill. . . . One would see as little of psychical processes, of ideas and thoughts, as in the movements of the mill

(*Introduction to Philosophy*, p. 84). Does this fact, however, that scientific observation is limited to physical processes prove that there is nothing except the physical in existence? On the contrary, the existence of consciousness is proved in the experience of each individual by the fact of his own awareness. As Professor Royce has expressed it: "Were physiologists better endowed with sense organs and with instruments of exact observation, we can, if we choose, conceive them as, by some unknown device, coming to watch the very molecules of our brains; but we cannot conceive them, in any possible case, as observing from without our pains or our thoughts in the sense in which physical facts are observable. . . . No microscope could conceivably reveal them. To me alone, would these states be known. And I should not see them from without; I should simply *find* them, or *be aware* of them. And what it is to find them, or to be aware of them, I alone can tell myself" (*Outlines of Psychology*, pp. 4, 5).

Thus, whoever asserts that scientific observation is capable of studying all of what properly goes under the name of psychology is refuted by the experience of each individual. There is consciousness and it is known directly only through introspection, which is not a scientific method inasmuch as its objects are not objects of common observation. What I refer to in saying, "I am conscious," or "I experience a sensation," is beyond the reach of a purely objective scientific study. To assert that scientific method is the only method, and especially to assert that nothing exists which scientific observation is incapable of reaching, is to commit the *fallacy of exclusive scientific methodology*.

The objection might be raised, however, that consciousness may be capable of becoming an object of scientific investigation through its sensible effects, just as in the case, for example, of electricity. Scientific hypotheses regarding electricity may be tested through observation of its sensible effects. There is not a correct analogy here, however. Few of those who assert that consciousness is a fact would admit that it has any observable effects in the outer, physical world. To assert that it does influence physical events

would be to affirm the theory of psycho-physical interaction, which is contrary to the principle of the conservation of energy. The existence of electricity and of similar scientific entities "makes a difference" in the occurrence of observable external events, but consciousness, in the sense in which the term is employed in this article, cannot "make a difference" in the phenomena of physics and of physiology.

Behaviorism may limit itself to an objective study of behavior merely, without using terms referring to psychical contents, while admitting that consciousness is real but accessible only to a philosophical study; and when it does this I classify myself as a behaviorist. It seems to me probable that there is a mechanistic, i. e., physico-chemical, basis of all human behavior; including language and the processes involved in such complex responses, for example, as those of Shakespeare in writing his plays or in the work of a mathematician in formulating the principles of mathematics. And I am in hearty accord with the general spirit of the work of such a biologist as Mr. Jacques Loeb in his studies of behavior. Mr. Loeb, however, commits the *fallacy of exclusive scientific methodology* when he comes to a discussion of consciousness. Objecting to the term "consciousness," which he correctly calls a metaphysical concept, he substitutes the term "associative memory." (See *Physiology of the Brain*, pp. 214, 15, 17, 32; *The Mechanistic Conception of Life*, p. 73.)

He then proceeds to define associative memory" in purely objective terms, as docility, or the capacity of the organism to learn new responses and consequently to modify inherited forms of response. He says, for example: "By associative memory I mean that mechanism by which a stimulus brings about not only the effects which its nature and the specific structure of the irritable organs calls for, but by which it brings about also the effects of other stimuli which formerly acted upon the organism almost or quite simultaneously with the stimulus in question" (*The Mechanistic Conception of Life*, pp. 73, 74). This is a case merely of the "conditioned reflex," and in his most recent book Mr. Loeb employs the latter term

(*Forced Movements, Tropisms, and Animal Conduct*, p. 167). The fallacy involved in substituting the term "associative memory" for the term "consciousness," and then in defining associative memory purely in terms of behavior, is that of denying by implication the existence of consciousness in its proper sense, as a fact of inner experience inaccessible to a scientific study.

There is a philosophical type of behaviorism which, if its metaphysical basis could be proved correct, would study consciousness itself objectively, thus escaping the fallacy of ignoring or of denying the existence of consciousness. I refer to such a metaphysical theory of consciousness as that, for example, which William James has so well expressed in his philosophy of radical empiricism, and which has been incorporated in the philosophy of American neo-realism. If one goes beyond both "common sense" and science, and asserts that the content of each personal stream of consciousness is identical with that portion of the outer environment to which the organism reacts selectively, then one may say that consciousness itself, conceived in the manner that such a theory presupposes, becomes an object of common observation. James, for example, maintained that "a given undivided portion of experience, taken in one context of associates, plays the part . . . of a state of mind, of 'consciousness'; while in a different context the same undivided bit of experience plays the part of a thing known, of an objective 'content'" (*Essays in Radical Empiricism*, pp. 9, 10). On this assumption consciousness itself may become an object of common observation, but this is a metaphysical assumption that no behaviorist merely as such can accept; nor can scientific method establish the truth of such an assumption.

In the field of general philosophy the *fallacy of exclusive scientific methodology* is committed by those naturalistic philosophers who claim for reality at large what extreme behaviorism claims for its special portion of reality, namely, the exclusive validity of the scientific method and the denial or the ignoring of the existence of anything beyond the reach of this method. A materialistic philosophy consisting of a generalization from the sciences may be refuted in

the same way as that in which an extreme behaviorism may be refuted. My personal awareness is, as has been shown, beyond the reach of scientific observation, and yet it is the thing that is most indefeasibly real for me. I thus am certain of at least one bit of reality of which not only extreme behaviorism but also a general philosophy of materialism, based exclusively on scientific method, denies the existence.

Whether or not some sort of an idealistic system of philosophy may be built up from this initial certainty of individual consciousness is another question, of which I will merely suggest a possible answer. The fact that man as viewed outwardly by the scientist is only a complex machine not different in kind from the other mechanisms in nature, while we acknowledge, though we do not observe, in every person a conscious life, which is purposive as purpose is experienced by ourselves—an inner freedom which is outwardly determined,—this fact suggests that the universe at large, though it is purely mechanical as the sciences describe it, no less so and no more so than the human organism, may also have an inner purpose, even a free and conscious purpose, no less real and perhaps infinitely more significant than finite human purposes. Just as I ascribe to other persons an inner, conscious life which objective observation does not reveal to me, while at the same time viewing them outwardly as mechanisms explainable in terms of stimulus and response, so to the totality of existence, explainable outwardly in terms of mechanistic science, I at least cannot deny the possibility of an inner life analogous to my own inner life and to that of my fellow men. To deny the possibility of such a reality on the ground that it is not an object observable by scientific method would be to commit the *fallacy of exclusive methodology*. If there be such a conscious purpose in the universe at large, it is by its very nature as inaccessible to scientific observation as is my own consciousness.

It seems strange that even many philosophers should have been so much dominated by the prestige of modern science. That the popular mind should fall under the spell of science is easily enough

accounted for. Science is practical. As Bacon said, scientific knowledge is power over nature. As a result of modern science, nature has been turned to man's uses to an extent that earlier generations would not have believed possible. Applied science has yielded innumerable satisfactions to man's desires for physical health and comfort and achievement. The progressive conquest of nature by science even stirs the blood by its dramatic venturesomeness. In contrast with the picturesque story of modern science, the story of philosophy seems uninteresting to the type of mind that does not care to exercise its human prerogative of abstract thinking. Philosophy is not practical; it can bake no bread: and yet it deals with problems that are, in a sense, the most practical of all problems in so far as their solution can help mankind to feel at home in a universe that seems outwardly so alien to man's inmost interests.

While one can understand why the popular mind should think the term "scientific" always a complimentary one, and the term "philosophic" almost a reproach, one can hardly forgive this attitude in those of greater discernment. Why should the student of the mind object to the admission that a part of his field is not science but philosophy? Why not take the epithet, "arm-chair psychologist" as a genuine compliment (even though it be not intended as such)? The psychologist who does not go beyond the scientific method of the laboratory to the reflective method of philosophy fails to cover the whole field of psychology. Behavior can be studied scientifically and behaviorism can be applied in such practical fields as advertising, salesmanship, pedagogy, and the like. The scientific study of behavior can be of great assistance also, in an indirect way, to the understanding of purely theoretical problems of consciousness itself. The philosopher should make what use he can of scientific result. But psychology will always be in part a *philosophy* of consciousness or else it will be an incomplete psychology. The sciences may and ought to aim at a complete description of the physical world; and yet there will always remain, over and above the most complete scientific descriptions that are possible, philosophical problems such, for example, as the one briefly touched upon above. By its very

nature such a problem cannot be dealt with by the scientific method. The philosopher, if he rightly conceives of his problems and of his method, can never be displaced through the advances of science. He should co-operate with the scientists, welcoming each new scientific achievement, while being proud at the same time to be a worker in the important and distinctive field of philosophy.

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